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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,553	09/29/2003	Nam-Yul Yu	45790	4282

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EXAMINER	
ODOM, CURTIS B	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/671,553	YU ET AL.	
	Examiner	Art Unit	
	Curtis B. Odom	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-13 and 16-20* is/are rejected.

7)☐ Claim(s) *4,5,14 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2, 6-9, 12, and 16-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. MPEP 2106 V, Section A states:

When a claim or part of a claim is defined in computer program code, whether in source or object code format, a person of skill in the art must be able to ascertain the metes and bounds of the claimed invention. In certain circumstances, as where self-documenting programming code is employed, use of programming language in a claim would be permissible because such program source code presents "sufficiently high-level language and descriptive identifiers" to make it universally understood to others in the art without the programmer having to insert any comments. See Computer Dictionary 353 (Microsoft Press, 2ed. 1994) for a definition of "self-documenting code." Applicants should be encouraged to functionally define the steps the computer will perform rather than simply reciting source or object code instructions.

Claims 2, 6-9, 12, and 16-19 recite limitations defined in computer program code. However, the claims are deemed indefinite since the applicant has simply recited code

instructions and has not functionally defined the steps the computer will perform. The applicant is encouraged to functionally define the steps the computer will perform.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, 11 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Yonge, III et al. (U. S. Patent No. 6, 553, 534) in view of Stralen et al. (U. S. Patent No. 2003/0126550).

Regarding claim 1, Yonge discloses a method of receiving a method of receiving encoded and then shuffled (interleaved) data in a communication system (see column 4, line 64-column 5, line 3) supporting multi-level demodulation (see column 8, lines 58-63, wherein QPSK is a multi-level modulation), comprising the steps of:

demodulating (see column 5, lines 17-22) received data according to a predetermined demodulation scheme (see column 5, lines 26-37, wherein the signal is demodulated according to a predetermined scheme using a control signal generated at the transmitter (see column 4, lines 67-column 5, line 12) and outputting a modulation symbol having a predetermined number of

code symbols in a symbol block (see column 4, lines 49-53, wherein the symbol block size is specified);

deshuffling (deinterleaving, see column 9, lines 44-53) soft decisions representing the code symbols in order corresponding to the interleaving, the de-interleaving being determined considering the demodulation scheme (see column 4, line 67-column 5, line 12, wherein the interleaving is based on the modulation scheme, thus the de-interleaving is based on the demodulation scheme)and

reading (see column 9, lines 44-53) the de-interleaved code symbols, decoding the code symbols (see Fig. 2, blocks 88 and 90) at a predetermined code rate (see column 4, line 60-column 5, line 12), and outputting a processed packet.

Yonge does not disclose the de-interleaving is determined considering a structure of the de-interleaving memory.

However, Stralen et al. discloses real-time de-interleaving where the addresses of the samples to be stored are ordered in a way in which the decoder requires them (see section 0038). Instead of moving the contents of the memory addresses, the addresses themselves are manipulated to provide the contents of certain locations required (see section 0037). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the de-interleaving structure of Yonge with the structure according to Stralen et al. since Stralen et al. states that real-time de-interleaving maximizes decoding speed (see section 0036).

Regarding claim 3, Stralen et al. further discloses a deinterleaving structure for providing real-time de-interleaving (see Fig. 3), wherein code symbols are separated into systematic symbols with a relatively high priority and parity symbols with a relatively low priority, and the

systematic symbols and the parity symbols are stored in separate memories (see section 0056). It would have been obvious to include this feature since Stralen et al. states that real-time de-interleaving maximizes decoding speed (see section 0036).

Regarding claim 11, the claim includes limitations corresponding to the above rejection of claim 1, which is applicable hereto.

Regarding claim 13, which inherits the limitations of claim 11, Stralen et al. further discloses the storage for real-time de-interleaving comprises:

a first memory (Fig. 3, block 76) for storing systematic symbols with a relatively high priority among the code symbols;

at least one second memory (Fig. 3, blocks 62 and 64) separate from the first memory, for storing parity symbols with a relatively low priority among the code symbols; and

a write address generator (see Fig. 3, block 30) for selecting a memory each time a code symbol is received generating a write address indicating a p^{th} memory area at which the code symbol is to be stored in the selected memory (see section 0056) according to a de-interleaving definition (address sequences) corresponding to an interleaving definition (see column 0058).

It would have been obvious to include this feature since Stralen et al. states that real-time de-interleaving maximizes decoding speed (see section 0036).

5. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonge, III et al. (U. S. Patent No. 6, 553, 534) in view of Stralen et al. (U. S. Patent No. 2003/0126550) as applied to claim 1, and in further view of Applicant Admitted Prior Art.

Regarding claim 10, Yonge discloses a multi-level modulation/demodulation scheme of QPSK (see column 8, lines 58-63). However, Yonge and Stralen et al. do not specifically

disclose a demodulation order of 3 or higher. However, the applicant admits as prior art that multi-level modulation increases spectral efficiency (see page 1, lines 27-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include higher modulation/demodulation level (orders) in Yonge and Stralen et al. to increase spectral efficiency.

Regarding claim 20, the claim includes limitations corresponding to the above rejection of claim 10, which is applicable hereto.

Allowable Subject Matter

6. Claims 4, 5, 14, and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 2, 6-9, 12, and 16-19 are allowable over prior art references if above 112 rejections are overcome.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Razzell (U. S. Patent No. 6, 975, 692) discloses demodulating, storing demodulated symbols in a de-interleaver, and decoding the symbols. Djokovich et al. (U. S. Patent No. 6,

952, 458) discloses de-mapping symbols according to the demodulation scheme. Shoji et al. (US 2003/0162542) discloses QPSK is a multi-level modulation.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Curtis Odom
December 9, 2006

JAY K. PATEL
SUPERVISORY PATENT EXAMINER